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# ECRO Newsletter

European Chemoreception Research Organization

Number 70 (Spring, 2004)

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**Some like it hot**

Different receptive structures – different qualities of trigeminal sensation

## **Contributions to the ECRO Newsletter**

The ECRO Newsletter is published twice a year. Material for inclusion in the Newsletter should reach the editor by early March for the spring edition and early September for the fall edition.

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## **Comments from the ECRO President**

Dear ECRO members,

Another half year has passed and we are approaching several important events. In July the ISOT meeting in Kyoto will attract many olfaction and taste scientists and in September our own meeting is taking place in Dijon. I hope as many as possible of you have time and possibility to attend these meetings. For students we have organised for a number of grants this year, both to attend these two meetings and the AChemS meeting in April. By doing so we hope to increase the number of young researchers taking active part in the conferences.

One of the main efforts of the board during the last year has been to improve our presence on the web. A new homepage is now ready to go "on air", and we hope that this will facilitate your interactions within ECRO and that we can add more and more useful features to our homesite. It is really there we can meet easily between ECRO meetings.

The board is also working actively to improve the economic resources of our organization. Contacts with companies are ongoing and some of them have already been fruitful. Another important contribution to our economy is of course the members fees, and I urge you all to check if you have payed your membership fee this year. Your contributions make it possible for us to support young scientists and students to attend meetings and to visit laboratories all over the world.

At the meeting in Dijon the General Assembly of ECRO will take place. It is important for our organisation that as many as possible of you take part in the process of shaping the organisation for the future. At the general assembly the board will put forward a number of suggestions to improve communication and membership influence in ECRO.

I hope to see as many as possible in Dijon, and until then I wish you all a good and relaxing summer!

*Bill Hansson*

## **Thanks for Two Good Years...**

After having been editor of the ECRO Newsletter for the past two years it is time for me to move on to new challenges. I am about to take over as head of my department at Umeå University which will keep me busy for the next few years – although I do not intend to drop my scientific work.

I am quite convinced that the Newsletter, and thereby the ECRO community, will gain from having a new editor who most likely will cover chemoreceptive issues from perspectives other than I have been covering. Who knows, maybe the new Newsletter editor, to be decided by the General Assembly of ECRO in Dijon, will be inspired to find new ways of communication by means of the Newsletter?

I am very thankful for these past two years as an editor, which have given me new insights into our chemosensory community in terms of

both its members and the exciting scientific work that is being conducted.

*Editor*

### **Third Olfactory Bioresponse Meeting, December 2 – 5, 2003, Dresden, Germany**

#### **Report**



The Bioresponse meetings are a series of conferences which started in 1995 at the Department of Pharmacology at the University of Erlangen, in Germany. The third version, entitled Olfactory Bioresponse Meeting III, gathered researchers from a large variety of countries in the new facilities of the Max-Planck Institute for Molecular Cell Biology, situated in eastern Germany in the beautiful town of Dresden. The conference site as such suited the needs of the conference perfectly since ample space was at hand for informal meetings in-between sessions. As in the two previous meetings, the focus of the presentations was on studies utilizing electrophysiological and imaging techniques and gladly, clinical studies also found their way into this meeting's program. Perhaps this was a reflection of the organizer's own personal interest.

A total of 72 presentations were given during the conference and they dealt with a spectrum of chemosensory research which ranged from single cell studies to human behavioral studies.

This year a number of presenters highlighted the usefulness of olfactory assessment of a clinical population, especially with regards to differentiating between different neurological diseases. These presentations illustrate how the clinical use of olfactory research has been growing in popularity in the past few years. However, as in past meetings the dominant theme of most presentations was the neuropsychological investigation of olfactory processing using imaging techniques. It has become clear to all those in the imaging community as well as those interested in neural correlates of behavior that the use of fMRI to answer these questions has been propagating at an incredible rate and this was clearly evident at the third Olfactory Bioresponse Meeting. Several interesting studies were presented and almost all had as an over reaching aim to further deepen our understanding of how the brain process chemosensory information using both fMRI and ERP techniques. I was more than happy to see that several studies had assessed integrative multimodal sensory stimuli. This is a very difficult research area that desperately needs to be given more attention if we really wish to unravel the mystery behind how our brains process chemosensory stimuli. The field lacks more studies that have as a primary role to help answer this important and often overlooked question of stimulus integration. It was very exciting to see so many researchers finally diverging from the standard unimodal stimulation that we usually limit ourselves to in the laboratory setting.

Emotional and behavioral studies did also have a prominent role at the conference with studies showing the importance of the surrounding environment as well as the role of contextual stimuli in the perception of odors. In addition, the conference participants were fortunate to listen to three methodological talks about olfactory receptors. Speakers elaborated on recent research that helps answer important basic questions such as how the receptors evolved, how they are regulated as well as how they function. One such presentation was delivered by Marc Spehr (Ruhr Universität, Bochum) where he discussed his recent Science article that dealt with the presence of olfactory receptors in spermatozoa. This recent research made him an ideal candidate for the Von Skramlik Award.

German speakers were well rewarded for their research, taking all three of the poster awards. Prizes were allotted to Nils Damann (Ruhr Universität, Bochum), Christian Roth (University of Dresden Medical School, Dresden), and Claudia Rupp (University Clinics of Innsbruck) for their presentations.

The social events were an astonishing parade of the best of German culture in respect to food and scenery. The conference was launched in the house of the Saxonian Parliament where registrants could sign up as well as indulge in the extravagant German buffet that was in the center in the social venue of the night. This grand opening ceremony was sure to set the tone for what yet was to come, and we were not disappointed. Two more delicious evening dinners took place in the beautiful and historical settings around

Dresden and one such dinner was even accompanied with live German music which gave the attendees a taste of German culture at its best.

To sum up, the third Olfactory Bioresponse Meeting had the perfect combination of exciting scientific presentations, lavish social gatherings, and ample time for informal meetings between researchers with mutual interests. This rare blend is surely what made this scientific gathering elevate from being good to perfect. The organizers, with **Thomas Hummel** and **Gerd Kobal** in charge, should be warmly congratulated on the effort they put into organizing such a splendid meeting. Those of us who had the privilege of attending are surely already looking forward to the forth Olfactory Bioresponse Meeting that, according to a rumor started by Gerd Kobal, might take place the forthcoming year in Richmond, Virginia.

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## **Trigeminal Chemoreception: Perspectives**

### **– A Personal Commentary**

During the last decades trigeminal chemoreception has received increasing attention, sparked through seminal work by the groups around Bill Cain, Gerd Kobal, Tom Finger, Jim Walker, Barry Green, and Wayne Silver, to mention a few significant laboratories. As an expression of this effort, more and

more publications on olfactory function contain statements about potential trigeminal effects of the stimulants used.

Salient findings of trigeminal research include the discovery of certain receptive structures which explain the different qualities of trigeminal mediated sensations, e.g. tingling, stinging, or burning [23]. Apart from C-fibers and A<sub>delta</sub>-fibers these receptive structures include the VR1 receptor [5, 6], the nicotinic receptor [2, 31], the ASIC receptors [24, 25], the M2 receptor [34], or the P2X receptor [29]. Most excitingly, solitary chemosensory receptor cells have been found to be attached to trigeminal afferents [9]. While their existence in humans is unclear, they may significantly broaden the spectrum of substances which activate the trigeminal system in a specific manner. Thus, it seems that the trigeminal system allows to discriminate between numerous different chemical stimuli – although the discrimination of stimulus qualities is orders of magnitude below that of the olfactory system. Having said this, based on the work by Cain, Cometto-Muniz and co-workers [1] it is also clear that the physico-chemical properties of most chemicals (e.g. molecular size or lipophilicity) determine the degree to which they activate the trigeminal system.

A number of techniques have been developed to study trigeminal function in humans. They include the psychophysical lateralization paradigm [3, 8, 22, 35], the electrophysiological recordings of the negative mucosal potential [11, 20, 32] or the recording of the trigeminal event-related potential [16, 21]. It is interesting to note that little

research has been done on the cerebral processing of intranasal trigeminal stimuli (e.g., [12, 19, 27]) – especially when considering the large number of publications using functional imaging in response to olfactory stimulation (for an overview see [36]).

However, especially in a clinical context, until to date there is no simple means which would provide a standardized testing of trigeminal function in humans which would be reliable, and, importantly, would take only little time to obtain.

A major limitation of many studies, however, is that only CO<sub>2</sub> has been used as the trigeminal stimulant [4, 14]. This gas has the advantage of having little or no odor (after all, expiratory air contains CO<sub>2</sub> in concentrations up to approximately 8%), is inexpensive, and non-toxic. However, other trigeminal stimuli like capsaicin [32], menthol [11, 33], or nicotine [18, 26] have received relatively little attention, although they activate the trigeminal system through differential receptive structures, and thus, may influence the olfactory system in a specific manner.

Many open questions also relate to interactions between the olfactory and the trigeminal systems [17]. For example, little attention has been paid to the differential temporal processing of trigeminally mediated information, and how this would affect the processing of odorous information. When painful stimuli are administered at short interstimulus intervals C-fiber mediated summation may occur, while this phenomenon is not present at longer interstimulus intervals [15]. In addition, among other aspects, the spatial

processing of olfactory/trigeminal information may also contribute to phenomena such as the differences observed between ortho- and retronasal perception of odors [10, 13].

Exciting findings can be expected from studies into the genetic variability of trigeminal receptors (e.g. VR1 polymorphisms [30]) or opioid receptor polymorphisms [28]. These studies will reveal significant sources of the heterogeneity of individual responses to trigeminal stimulation. And last not least, research on contextual components of responses to trigeminal stimuli are expected to yield highly important information on the environmental significance of odors [7].

In conclusion, trigeminal function has received increasing recognition as an important part of the sense of smell. Research in this area can be expected to produce significant findings especially when it is performed in cross-talk with current research in the field of general nociception.

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## New Books

*Vomeronasal Chemoreception in Vertebrates: A Study of the Second Nose*

C. Evans & D.M. Stoddart. Imperial College Press. 2003.

*Chemoreception: From Cellular Signalling to Functional Plasticity*

Edited by J.-M. Pequignot et al. Plenum Pub Corp. 2003.

*Handbook of Olfaction and Gustation (2<sup>nd</sup> edition)*

Edited by R.L. Doty. Marcel Dekker. 2003.

*Pheromones and Animal Behaviour: Communication by Smell and Taste*

T.D. Wyatt. Cambridge University Press. 2003.

## Home Pages

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## About ECRO

ECRO seeks to promote and support research and to assist the exchange of information on all aspects of the chemical senses. It was inaugurated in 1970 at the International Summer Course on Odour Perception, in Utrecht, with the aim of promoting and

coordinating research in chemoreception. It was officially registered in Paris in 1971 and although it began as a European venture, it now has members from outside Europe and sees its function as world-wide. It encourages a multi-disciplinary approach to research in chemoreception. Since 1978 ECRO has been affiliated with UNESCO.

ECRO activities include (see [www.ecro-online.org/](http://www.ecro-online.org/) for further information):

- Congresses
- Mini-symposia
- Summer Schools
- Meetings for national groups
- Promotion of research in chemoreception through scholarships, fellowships and awards.

ECRO is financed by individual members' subscriptions and by donations from industry and research institutions. Its activities are administered by a Board of up to nine members responsible to the General Assembly, which is convened biennially. Currently, ECRO has over 400 members from 29 countries.

## Honorary Members

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## **Forthcoming Meetings**

*XIIIth International Symposium on  
Olfaction and Taste/JASTS*

Kyoto, Japan, July 5-9, 2004.

[www.epn.hal.kagoshima-u.ac.jp/  
ISOT2004/](http://www.epn.hal.kagoshima-u.ac.jp/ISOT2004/)

*7th Sensometrics Meeting*

Davis, CA, USA, July 28-30, 2004.

[www.statistik.uni-dortmund.de/  
sensometrics/](http://www.statistik.uni-dortmund.de/sensometrics/)

*Chemical signals in vertebrates*

The UK Semiochemistry Network, 21-  
22 July 2004 ,WITHERSDANE HALL,  
Imperial College at Wye (Ashford,  
Kent), UK.

[http://www.semiochemica.org.uk/  
workshops/](http://www.semiochemica.org.uk/workshops/)

*XVIth ECRO Congress*

Dijon, France, September 12-15, 2004.

[www.ecro2004.com](http://www.ecro2004.com)

*Annual Conference of the Australasian  
Association for Chemosensory Sciences*

Noosa, Australia, October 1-4, 2004

[www.get-me.to/aacs](http://www.get-me.to/aacs)

*6th Pangborn Sensory Science Symposium*

North Yorkshire, UK, August 7-11, 2005

[www.pangborn2005.com](http://www.pangborn2005.com)